

What is Claimed is:

1. An isolated and purified polynucleotide that encodes an opioid receptor polypeptide.

2. The isolated and purified polynucleotide of claim 1, comprising an isolated and purified polynucleotide that encodes a truncated opioid receptor polypeptide.

3. The polynucleotide of claim 2, wherein said truncated opioid receptor polypeptide is a truncated kappa or delta opioid receptor polypeptide.

4. The polynucleotide of claim 3, wherein said truncated opioid receptor polypeptide comprises amino acid residues 79 to 380 of a kappa opioid receptor polypeptide.

5. The polynucleotide of claim 4, wherein said truncated opioid receptor polypeptide comprises amino acid residues 167 to 228 of a kappa opioid receptor polypeptide.

6. The polynucleotide of claim 4, wherein said truncated opioid receptor polypeptide comprises amino acid residues 271 to 318 of a kappa opioid receptor polypeptide.

7. The polynucleotide of claim 3, wherein said truncated opioid receptor polypeptide comprises amino acid residues 70 to 372 of a delta opioid receptor polypeptide.

8. The isolated and purified polynucleotide of claim 1, further defined as encoding a chimeric opioid receptor polypeptide.

9. The polynucleotide of claim 8, wherein the polypeptide comprises the second extracellular loop of delta opioid receptor.

10. The polynucleotide of claim 8, wherein the polypeptide comprises the third extracellular loop of delta opioid receptor.

11. The polynucleotide of claim 8, wherein the polypeptide portions of both kappa and delta opioid receptors.

12. The polynucleotide of claim 11, wherein said chimeric polypeptide is designated as  $\kappa_{1-78}/\delta_{70-372}$  or  $\delta_{1-69}/\kappa_{79-380}$ .

13. The isolated and purified polynucleotide sequence of claim 1, further defined as a mutant opioid receptor polypeptide.

14. The isolated and purified polynucleotide sequence of claim 13, wherein in said mutant opioid receptor polypeptide is a mORD1 polypeptide having an asparagine at residue 95 instead of an aspartate.

15. The isolated and purified polynucleotide sequence of claim 13, wherein in said mutant opioid receptor polypeptide is a mutant opioid receptor polypeptide having the amino acid residue sequence of MORD1 of <sup>FIG</sup> Figure 1 except that residue number 128 is an asparagine residue. <sup>1</sup>

16. The isolated and purified polynucleotide sequence of claim 13, wherein in said mutant opioid receptor polypeptide is a mutant opioid receptor polypeptide having the amino acid residue sequence of MORD1 of ~~Figure 1~~ <sup>FIG. 1</sup> except that residue number 278 is an asparagine residue.

17. An isolated and purified opioid receptor polypeptide.

18. The opioid receptor polypeptide of claim 17, wherein the polypeptide is a recombinant polypeptide.

19. The opioid receptor polypeptide of claim 17, wherein the polypeptide is a delta, a kappa, or mu opioid receptor polypeptide.

20. The opioid receptor polypeptide of claim 19, wherein said polypeptide is a delta opioid receptor.

21. The opioid receptor polypeptide of claim 20, wherein said delta opioid receptor comprises the amino acid residue sequence of SEQ ID NO:4.

22. The opioid receptor polypeptide of claim 19, wherein said polypeptide is a kappa opioid receptor.

23. The opioid receptor polypeptide of claim 22, wherein the kappa opioid receptor comprises the amino acid sequence of SEQ ID NO:2.

24. The opioid receptor polypeptide of claim 22, wherein the kappa opioid receptor comprises the amino acid sequence of SEQ ID NO: 12.

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25. The opioid receptor polypeptide of claim 17, comprising a truncated opioid receptor polypeptide.

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26. The opioid receptor polypeptide of claim 25, wherein said truncated opioid receptor polypeptide is a truncated kappa or a delta opioid receptor polypeptide.

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27. The opioid receptor polypeptide of claim 25, wherein said truncated opioid receptor polypeptide comprises amino acid residues 79 to 380 of a kappa opioid receptor polypeptide.

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28. The opioid receptor polypeptide of claim 25, wherein said truncated opioid receptor polypeptide comprises amino acid residues 167 to 228 of a kappa opioid receptor polypeptide.

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29. The opioid receptor polypeptide of claim 25, wherein said truncated opioid receptor polypeptide comprises amino acid residues 271 to 318 of a kappa opioid receptor polypeptide.

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30. The opioid receptor polypeptide of claim 25, wherein said truncated opioid receptor polypeptide comprises amino acid residues 70 to 372 of a delta opioid receptor polypeptide.

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31. The opioid receptor polypeptide of claim 1, comprising a chimeric opioid receptor polypeptide.

5 32. The polypeptide of claim 31, wherein the polypeptide comprises the second extracellular loop of kappa opioid receptor.

10 33. The polypeptide of claim 31, wherein the polypeptide comprises the third extracellular loop of delta opioid receptor.

15 34. The polypeptide of claim 31, wherein the polypeptide portions of both kappa and delta opioid receptors.

20 35. The opioid receptor polypeptide of claim 31, wherein said chimeric polypeptide is designated as  $\kappa_{1-78}/\delta_{70-372}$  or  $\delta_{1-69}/\kappa_{79-380}$ .

25 36. The opioid receptor polypeptide sequence of claim 1, further defined as a mutant opioid receptor polypeptide.

30 37. The opioid receptor polypeptide sequence of claim 36, wherein in said mutant opioid receptor polypeptide is a mORD1 polypeptide having an asparagine at residue 95 instead of an aspartate.

35 38. The opioid receptor polypeptide sequence of claim 36, wherein in said mutant opioid receptor polypeptide is a mutant opioid receptor polypeptide having the amino acid residue sequence of MORD1 of <sup>FIG. 1</sup> except that residue number 128 is an asparagine residue.

39. The opioid receptor polypeptide sequence of claim 36,  
wherein in said mutant opioid receptor polypeptide is a mutant  
opioid receptor polypeptide having the amino acid residue  
sequence of MORD1 of <sup>FIG.</sup> Figure 1 except that residue number 278 is  
an asparagine residue.

40. The isolated and purified polynucleotide sequence of claim  
1, wherein the encoded opioid receptor polypeptide has  
pharmacologically altered properties relative to the  
pharmacological properties of previously defined opioid  
receptors.

41. The opioid receptor polypeptide of claim 40, comprising the  
amino acid residue sequence of SEQ ID NO: 6.

42. An antibody immunoreactive with an opioid receptor  
polypeptide.

43. A process of detecting an opioid receptor polypeptide,  
wherein the process comprises:

(a) immunoreacting the polypeptide with the antibody of  
claim 42 to form an antibody-polypeptide conjugate; and

(b) detecting the conjugate.

44. A process of detecting a messenger RNA transcript that  
encodes an opioid receptor polypeptide, wherein the process  
comprises:

(a) hybridizing the messenger RNA transcript with a polynucleotide sequence that encodes the opioid receptor polypeptide to form a duplex; and

5 (b) detecting the duplex.

45. A diagnostic assay kit for detecting the presence of an opioid receptor polypeptide in a biological sample, said kit comprising a first container containing a first antibody capable of immunoreacting with said opioid receptor polypeptide, wherein said first antibody is present in an amount sufficient to perform at least one assay.

15 46. A diagnostic assay kit for detecting the presence, in a biological sample, of an antibody immunoreactive with an opioid receptor polypeptide, said kit comprising a first container containing an opioid receptor polypeptide that immunoreacts with said antibody, and wherein said polypeptide is present in an amount sufficient to perform at least one assay.

25 47. A process of screening a substance for its ability to interact with an opioid receptor, said process comprising the steps of:

30 a) providing an opioid receptor polypeptide;  
b) testing the ability of said substance to interact with said opioid receptor.

35 48. The process according to claim 47, wherein said opioid receptor polypeptide is a chimeric opioid receptor polypeptide.

49 The process of claim 48, wherein the polypeptide comprises the second extracellular loop of delta opioid receptor.

50 The process of claim 48, wherein the polypeptide comprises the third extracellular loop of delta opioid receptor.

51 The process of claim 48, wherein the polypeptide portions of both kappa and delta opioid receptors.

52 The process according to claim 48, wherein said chimeric opioid receptor polypeptide is designated as  $\kappa_{1-78}/\delta_{70-372}$  or  $\delta_{1-69}/\kappa_{79-380}$ .

53 The process according to claim 47, wherein said opioid receptor polypeptide is a truncated opioid receptor polypeptide.

54 The process of claim 53, wherein said truncated opioid receptor polypeptide is a truncated kappa or a delta opioid receptor polypeptide.

55 The process of claim 53, wherein said truncated opioid receptor polypeptide comprises amino acid residues 79 to 380 of a kappa opioid receptor polypeptide.

56 The process according to claim 47, wherein said opioid receptor polypeptide is a mutant opioid receptor polypeptide.



57. The process according to claim 56, wherein said mutant opioid receptor polypeptide is a mORD1 polypeptide having an asparagine at residue 95 instead of an aspartate.

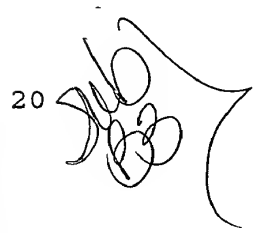
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58. The process according to claim 47, wherein providing said opioid receptor polypeptide is transfecting a host cell with a polynucleotide that encodes an opioid receptor polypeptide to form a transformed cell and maintaining said transformed cell under biological conditions sufficient for expression of said opioid receptor polypeptide.

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59. A process of making a product with an ability to act as a specific agonist of a kappa opioid receptor, said process comprising the steps of:

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- a) providing an opioid receptor polypeptide; and
  - b) obtaining a candidate specific kappa opioid receptor agonist;
  - c) testing the ability of said substance to interact with said opioid receptor; and
  - d) providing a product that has the ability to interact with the opioid receptor.

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60. The process of claim 59, wherein the opioid receptor polypeptide comprises a portion of a kappa opioid receptor polypeptide.

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61. The process of claim 60, wherein the opioid receptor polypeptide comprises a portion of a second extracellular loop of the kappa opioid receptor polypeptide.

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62. The process of claim 61, wherein the opioid receptor polypeptide comprises a negatively charged region of the second extracellular loop of the kappa opioid receptor.

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~~SW  
DS~~ 63. The process of claim 59, wherein the opioid receptor polypeptide comprises a chimeric opioid receptor polypeptide.

~~SW  
DS~~ 15 64. The process of claim 63, wherein the polypeptide comprises the second extracellular loop of kappa opioid receptor.

20 65. The process of claim 63, wherein the polypeptide comprises the third extracellular loop of delta opioid receptor.

~~SW  
DS~~ 25 66. The process of claim 63, wherein the polypeptide comprises portions of both kappa and delta opioid receptors.

67. The process of claim 63, wherein said chimeric polypeptide is designated as  $\kappa_{1-78}/\delta_{70-372}$  or  $\delta_{1-69}/\kappa_{79-380}$ .

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68. The process of claim 59, wherein the opioid receptor polypeptide comprises a truncated opioid receptor polypeptide.

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69. The process of claim 68, wherein said truncated opioid receptor polypeptide is a truncated kappa opioid receptor polypeptide.

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70. The process of claim 69, wherein the truncated opioid receptor polypeptide comprises amino acid residues 79 to 380 of a kappa opioid receptor polypeptide.

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71. The process of claim 69, wherein the truncated opioid receptor polypeptide comprises amino acid residues 167 to 228 of a kappa opioid receptor polypeptide.

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72. The process of claim 59, wherein the candidate specific kappa opioid receptor agonist is pre-screened determining whether the candidate has a positive charge.

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73. The process according to claim 59, wherein providing said opioid receptor polypeptide is transfecting a host cell with a polynucleotide that encodes an opioid receptor polypeptide to form a transformed cell and maintaining said transformed cell under biological conditions sufficient for expression of said opioid receptor polypeptide.

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74. A specific kappa opioid receptor agonist isolatable by the process of claim 59.

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as

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